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SAFEGUARDS FOR THE USE OF MINES AND EXPLOSIVES IN TRAINING.(U)
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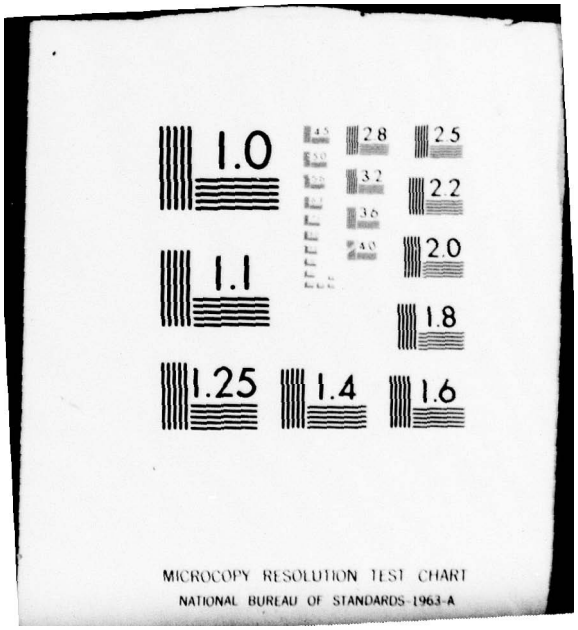
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LEVEL II

OFFICE, CHIEF OF ARMY FIELD FORCES
Fort Monroe, Virginia

ATENG 729.3/5(4 Feb 54) 4 Feb 54

SUBJECT: Safeguards for the Use of Mines and Explosives in Training.

TO: See distribution

1. The inclosed memorandum specifies the appropriate safeguards for the use of explosives and explosive devices in training. The rising incidence of training accidents involving explosives of various types indicates that existing regulations are not adequate, or are not being followed in all cases. More complete instructions, similar to those contained in inclosure, will be contained in a forthcoming revision of SR 385-310-1.

2. Pending issuance of the revised SR 385-310-1 the provisions of the inclosed memorandum will be utilized in the conduct of applicable training under the jurisdiction of this Office.

FOR THE CHIEF OF ARMY FIELD FORCES:

T. J. Smith

T. J. SMITH
Colonel, AGC
Asst Adjutant General

1 Incl
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FOR THE CHIEF:

ALEXANDER NICOLINI
Major, Infantry
R&D Coordinator

SAFEGUARDS FOR THE USE OF MINES AND EXPLOSIVES IN TRAINING

1. PURPOSE.- This memorandum prescribes the general procedures necessary in the detonation of explosives, mines and firing devices used by troops in training. Many of these safe practices are equally applicable in combat. They are applicable from the time of receipt from post, camp or station Ordnance magazines to time of detonation or return to Ordnance control.

2. EXPLOSIVES.

a. General. - The following safe practices pertain to standard military and commercial explosives used by the Army and to items containing explosives such as M2 and M3 Shaped Charges, Bangalore Torpedo, M2 and M3 Demolition Snake, M1 Antipersonnel Mine Clearing Snake, M1 Antipersonnel Mine Clearing Cable, the Blast Driven Earth Rod and the M6 and M7 Antitank Mines.

(1) Explosives shall be handled carefully and handling will be so conducted as to limit the number of personnel exposed and the explosives handled to as small a quantity as practicable. Containers will be picked up, transported, and placed in position in a careful manner which prevents tumbling, rolling, dragging, throwing or dropping of the material.

(2) Competent supervision must be provided whenever it becomes necessary to have explosives handled by inexperienced personnel.

(3) Responsibility for supervision of preparation, placement and firing charges of a demolition project is to be assigned to one person only. A commissioned officer will be present at the time of firing of any charge. He will inspect all connections before firing and inspect the area after firing to determine that all charges have detonated. He will supervise the neutralization of all misfires.

(4) Most explosives have a low ignition point and catch fire easily, with detonation occurring if the explosives are in sufficient quantity. Utmost care must be taken to keep explosives away from fire. These procedures include the following:

(a) Smoking or open flames are prohibited near explosives.

(b) Explosives and caps are kept out of direct sunlight and away from other sources of heat.

(c) Only non-sparking tools are used on explosives and explosives containers.

(5) Dynamite, in addition to being highly combustible, is also very sensitive when frozen or chilled. Handle such dynamite as prescribed in FM 5-25.

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Safeguards for the Use of Mines and Explosives in Training:

(6) The gases released by the detonation of explosives will often cause severe headaches. Breathing of these fumes should be avoided.

b. Transporting to training areas:

(1) Vehicles used for the transportation of explosives shall be loaded only to rated capacity. The explosives shall be so secured as to prevent shifting of load or dislodgment from the vehicle in transit. In all open-body types of vehicles the explosives shall be covered with a fire-resistant tarpaulin.

(2) All vehicles transporting explosives shall be marked or placarded on both sides and ends with the word "EXPLOSIVES" in white letters not less than 3 inches high on a red background.

(3) Blasting caps or other exploders shall be transported in a vehicle separate from that used to carry explosives.

(4) All vehicles used for transportation of explosives shall be in charge of and operated by a person who is physically fit, careful, reliable, able to read and write the English language, and not addicted to the use of intoxicants or narcotics.

(5) When explosives are to be transported in the bed or body of a vehicle, this vehicle must be free of all metal not a part of the vehicle, including metal tools, carbides, oils, matches, firearms, electric storage batteries, acids, flammable substances, or oxidizing or corrosive compounds.

(6) Vehicles to be used in the transportation of explosives shall be in good repair. When steel or part steel bodies are used, fire-resistant and non-sparking cushioning materials shall be employed to separate the containers of explosives from the metal.

(7) Vehicles transporting explosives shall be equipped with not less than two fire extinguishers, placed at strategic points, filled and ready for immediate use, and of a make approved by the National Board of Fire Underwriters for class B and C fires.

(8) A vehicle containing explosives shall be unloaded before being taken into a garage or repair shop or parked in congested areas or stored overnight, or at any other time, in a public garage or similar building.

(9) All vehicles shall be checked before transporting explosives and all electric wiring completely protected and securely fastened to prevent short circuiting.

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Safeguards for the Use of Mines and Explosives in Training:

(10) Vehicles transporting explosives shall be operated with extreme care and shall be driven at a speed not greater than 35 miles per hour. Full stops shall be made at approaches to all railroad crossings and main highways and the vehicle shall not proceed until it is known that the way is clear.

(11) Explosives shall be transported in the bed or body of a vehicle only, nor shall any trailer be attached to a motor truck or vehicle hauling explosives.

(12) The authorized driver and helper only shall be permitted to ride on trucks transporting explosives or detonators.

(13) Only in an emergency shall a vehicle be refueled while carrying explosives.

(14) Smoking in, on or within 25 feet of a vehicle carrying explosives is prohibited.

c. Temporary storage in training areas:

(1) It is recommended that covered ammunition shelters be provided where practicable in order that a daily supply of explosives can be placed in training areas within reasonable distance of point of use. The construction of the shelter should be adequate to stop any missile which might strike same.

Explosives and components containing explosives should be separated in such manner that fire or explosion will not be communicated from one shelter or pile, or from detonation points, to another shelter or pile. Temporary open storage in any one pile should be limited to not over 500 lbs of explosives wherever practicable, and distance between piles should be not less than 800 feet. Demolition materials, dynamite, black powder, and detonators, shall each be placed in separate shelters or piles in the field. Practice, dummy or inert, and service components will each be placed in a separate pile or stack which is designated for that type of component.

(2) When explosives, caps or other explosive components are temporarily stored in a training area a guard must be provided at all times.

(3) All explosives or components containing explosives must be accounted for after completion of field training. Items used plus items returned should equal items drawn.

d. Firing.

Safeguards for the Use of Mines and Explosives in Training:

(1) General. - Lightning and other sources of extraneous electricity constitute definite hazards when firing charges either electrically or non-electrically. A strike or a near miss by lightning is almost certain to detonate either type of circuit. For this reason blasting operations should be suspended and personnel moved to a safe distance upon approach of an electrical storm. Other possible sources of static electricity, such as moving belts, escaping steam, and operating machinery should be considered and eliminated before connecting up charges, especially when working with electric circuits. Radio transmitters and power lines also produce electrical energy and any electric blasting within one mile of a broadcasting or high-power short wave station or within one-quarter mile of all other radio transmitters must be considered a potential hazard. Non-electric and detonating cord systems are recommended in such locations.

(2) Priming.

(a) Electric.

1. All caps used in a circuit shall be of the same manufacture.

2. Caps shall be tested with an approved galvanometer before priming.

3. Caps will be short-circuited by means of the accompanying shunt or by twisting the bare ends of the wires together until ready to be connected into the circuit.

4. Only after all caps have been connected in the circuit will the final connection be made to the firing wire.

5. The ends of the firing wire at the charge shall be kept twisted together until ready to tie into the cap circuit. The blasting machine ends of the wire shall be kept twisted together until after the warning signals are given preparatory to connecting the blasting machine.

6. The blasting machine or an essential component thereof shall be kept under guard at all times during preparation of the charge until ready to fire.

7. The cap lead wires will not be pulled or tampered with.

8. Only the batteries issued for the galvanometer will be used in the galvanometer.

Safeguards for the Use of Mines and Explosives in Training:

9. In the event of a misfire in an electric circuit the leading wires must be disconnected from the source of power before leaving the firing point to investigate. Investigation should be delayed long enough to insure that the misfired charge is not burning.

(b) Non-electric

1. When crimping caps, crimp near the open end, pointing it out and away from the body and using only the issued cap crimpers.

2. Caps will be removed from the cap box with the finger tips. The only materials to be inserted into the end of caps will be time fuse, detonating cord or standard fuse base. They will not be forces.

3. Charges will be placed on the ground or on material to be demolished before lighting their fuses.

4. Prime explosives only when planning to detonate them immediately, and never store primers after they are assembled.

5. Wait at least thirty minutes after the expected time of detonation before investigating any non-electric misfires. Handle misfires as instructed in subpar 2k(2) below.

6. Test time fuse by burning and timing a short length before using. Before using, cut off and discard 2 or 3 inches of the end of the roll to eliminate any absorbed moisture.

7. When using a fuse lighter with less than one foot of time fuse, tape the cap-fuse connection to prevent the flash of the fuse lighter from spitting directly into the cap.

8. When firing charges with non-electric caps all underground charges will be primed with detonating cord whenever possible.

(3) Placement of charges.

(a) All prepared demolition charges fired in training should be fired electrically with the exception of primers made for the purpose of instruction in the use of non-electric caps and time fuse. These should be fired only above the ground surface, untamped.

(b) Whenever practicable underground charges will be primed with detonating cord, having the detonating cord attached to the blasting cap above the ground.

Safeguards for the Use of Mines and Explosives in Training:

(c) Charges placed against wood, steel, concrete or other solid material should be placed on the side nearest the observers so as to send fragments away from them.

(d) Charges placed on steel should not exceed 2 pounds, and should be fired only in an enclosed, roofed steel pit of concrete, or timber and earth construction, or in an excavated pit at least 3' in depth. If fired in an open pit, a hempen mat should cover the charge. Personnel should be at least 300 yards away in defilade and preferably under overhead cover, or at least 100 yds away if in a debris-proof shelter. (See Annex #1)

(e) Charges placed on concrete should not exceed 40#, placed on the side nearest the observers. Observers should be at least 100 yards away if in a debris-proof shelter, or 300 yards away and in defilade from the charge when debris-proof shelters are not available. An unoccupied distance of 1,000 yards must be provided on the opposite side of the charge, since this is where most of the missiles will be thrown.

(f) Actual insertion of the blasting cap or primer in all charges (except when firing simple primers) should be done by not more than two trainees under supervision of one instructor after the remainder of the trainees and observers have withdrawn to a safe position.

e. Missile hazard distance.

(1) The greatest danger to personnel engaged in observing the firing of charges is from the missiles thrown by the explosion. The blast effect, i.e., increase in air pressure, can be ignored in all demolition work undertaken in Army Training Programs.

(2) How far a missile will travel in air from an explosion is primarily a function of the weight, shape, density, initial angle of projection and initial speed of the missile. For bare charges or cratering charges over 500#, the formula -

"Safe Distance in feet equals 300 x $\sqrt[3]{\text{pounds of explosive}}$" gives the distance at which personnel in the open are relatively safe from missiles from charges placed on or in the earth. However, missiles <u>may</u> fly more than this distance. The minimum safe distance in any case is 300 yards.

(3) In addition to the above Safe Distance Formula for charges placed on or in the ground, debris-proof shelters must be provided for personnel when charges are placed to demolish solid materials as well as in quarry training. Steel helmets should be worn by all personnel when observing firing unless personnel are in debris-proof shelters. Missile hazard from cased explosives and steel cutting charges is more potent than that from cratering or quarrying charges due to the differences in the initial velocities of the missiles thrown by the charge.

Safeguards for the Use of Mines and Explosives in Training:

f. Warning of firing.

(1) In all cases where detonation of explosive charges is to be conducted, a warning order will be published to the entire garrison at least 24 hours prior to the time of detonation showing and place it is to be conducted, the hour it is to begin and cease each day, and the boundaries of the danger area.

(2) A red range flag should be displayed in a prominent place in the area during blasting.

(3) Immediately before firing any charge (other than charges fired as simulated artillery, etc., in infiltration or combat training courses) the warning cry, "Fire in the Hole," will be given three times by all personnel present, and if possible, three short blasts sounded on a siren. One long blast on the siren signifies that the charges have all been detonated or cleared.

(4) Range guards will be used on roads and access routes into the danger area. Demolition areas will be posted with appropriate warning signs.

g. Use of explosives for simulated artillery or mortar fire.

(1) Charges used to simulate artillery or mortar fire will be fired in demolition pits only.

(2) Only charges up to one-quarter pound of TNT will be fired in the demolition pits of the infiltration course unless the wall of the pit is built up above the ground more than 24 inches high and 12 inches thick with sandbags.

(3) All charges used to simulate artillery or mortar fire will be fired electrically.

(4) The firing point for charges simulating artillery or mortar fire on an infiltration course will be so located that the person firing such charges can see each demolition pit and the immediate vicinity thereof.

h. Firing of shaped charges, bangalore torpedoes and mine clearing snakes:

(1) Shaped charges will be placed on the side of the material nearest the observers. Observers will be at least 250 yards distant from shaped charges when fired unless in defilade from the charge or in a debris-proof shelter.

Safeguards for the Use of Mines and Explosives in Training:

(2) Bangalore torpedoes will be fired only in a horizontal position on the ground. Personnel will be in debris-proof shelter or at least 200 yards away in defilade.

(3) When firing the M2A1 or M3 Demolition Snake, personnel within 1,000 yards laterally or 500 yards directly in line with the snake will be under overhead cover or in foxholes.

(4) When firing the M1 Antipersonnel-Mine-Clearing Snake, no personnel should be forward of the initial location of the tail of the snake. The men firing the snake should take cover in a prone position 250 feet behind the tail of the snake.

(5) When firing the M1 Antipersonnel-Mine-Clearing Detonating Cable, no personnel should be forward of the tail of the cable. Men firing the snake should take cover in a prone position 250 feet behind the tail of the cable.

(6) Blast Driven Earth Rod. - When firing the blast driven earth rod, personnel will be at least 100 yards from the rod, due to the possibility of the chamber rupturing. When firing widening charges in the borehole, personnel will be at least 100 yards away. No explosive other than the standard issue propelling charge will be used in the chamber. The chamber should be examined carefully before each firing for any evidence of cracking, bulging or other faults.

(7) When firing the shaped charge, bangalore torpedoes and mine clearing snakes, in addition to observing safe distances as covered above, all personnel will wear steel helmets.

i. Quarry Blasting.

(1) Maximum charge detonated at one time in quarry training will not exceed 100 pounds for primary blasting and 50 pounds for secondary blasting.

(2) Personnel not in debris-proof shelters will be at a distance in feet from the charge as computed by the formula $D = 350\sqrt[3]{\text{pounds of explosive}}$ or 500 yards whichever distance is greater. Missiles may be thrown distances exceeding this figure as a result of rock faults or improper placement of charges. Personnel should be in defilade. Personnel in debris-proof shelters will not be closer than 300 feet, providing the shelter is of sufficient strength to withstand any material which might be thrown onto it.

(3) All drill holes shall be of a greater diameter than the diameter of the cartridges of explosive used. Loading and drilling shall not be carried on at the same time in the same area.

(4) Drilling may be resumed after blasts have been fired when a thorough examination has been made by the officer-in-charge to make sure that there are no unexploded charges remaining.

(5) In loading small diameter boreholes, tamping shall be done with a wooden stick having no metal parts. Primed cartridges shall be seated by an even steady pressure only.

(6) No more cartridges will be primed than are required for an individual blast.

(7) All loaded holes or charges shall be checked and definitely located before firing.

(8) All caps used in a firing will be of the electric type. No caps will be placed in boreholes. Cartridges in holes will be primed with detonating cord with the connection to the cap being made above ground.

j. Cratering.

(1) Maximum charge to be fired in training in cratering will be 320 pounds.

(2) Personnel not in debris-proof shelters will be at a distance in feet from the charge as computed by the formula $D = 300\sqrt[3]{\text{pounds of explosive}}$ or 300 yards whichever distance is greater. Personnel in debris-proof shelters will not be closer than 300 feet, providing the shelter is of sufficient strength to withstand any material which might be thrown onto it.

(3) All cratering charges will be dually primed with detonating cord and no caps will be placed under ground.

k. Handling of Misfires.

(1) For electrical misfires, take the following steps:

(a) Check connections of firing wire to the terminals of the machine and make 2 or 3 more attempts to fire the charge.

(b) Disconnect blasting machine, twist firing wire ends together and check entire circuit for breaks.

(c) If charge is above ground, disconnect and remove the faulty cap, insert a new cap and fire.

(d) If charge is below ground or tamped and fault is not located by removing tamping to within one foot of the charge, place a new primer and two pounds of explosive at this point, replace the tamping and fire. Whenever possible, use detonating cord primers to set off misfires placed underground or in boreholes. If charges must be fired electrically, always disconnect original cap wire before connecting the new primer.

(e) An electrical misfire may be investigated immediately, providing the charge is not dually primed with a non-electric primer.

(2) For charges primed with non-electric caps and time fuze, take the following steps:

(a) Wait at least 30 minutes after the charge should have fired before investigating.

(b) If the charge is not tamped, insert a new primer block or cartridge. If tamped, remove tamping, place a new primer and two pounds of explosive at this point and replace the tamping.

(c) Avoid disturbing a misfired cap.

(3) For charges primed with detonating cord, take the following steps:

(a) If the cap fails to fire, handle as in (1) or (2) above.

(b) If an electric or non-electric cap fires but all or a part of the detonating cord fails to fire, or if the detonating cord fires and fails to fire the charge, it is safe to investigate immediately. Attach a new cap to the unfired detonating cord, or make a new primer and place it on the unfired charge.

3. Mines, Fuses and Firing Devices.

a. General - The following general precautions pertain to high explosive or service, practice and inert mines, fuses and firing devices.

(1) Do not mix service, practice and inert mines and fuses. Practice and inert mines should be painted their proper color and have the appropriate identifying terms stenciled upon their bodies.

(2) The regulations for handling and transporting explosives, par 2a and b above, are applicable to high explosive and practice mines, fuses and firing devices. Where mines and their fuses are packaged in the same crate or container, they may be transported together.

(3) The regulations applicable to warning personnel of firing, par 2f above, are applicable during the detonation of high explosive mines.

b. Antitank and Antipersonnel Mines.

(1) Inert Mines.- Inert mines and mine fuses do not contain any explosives and do not present a safety hazard. They should be painted black and be clearly labeled "INERT" in white letters to prevent their being mixed with practice and high explosive items. Inert, practice and high explosive mines and fuses will be stored separately.

(2) Practice Mines.- Practice mines and their fuses may contain a small, low explosive charge or a smoke producing increment. They should be painted blue and be clearly labeled "PRACTICE" in white letters to prevent their being mixed with high explosive or inert items.

(a) Mine, antitank, heavy, practice M-12 and mine, antitank, light, practice M-10 are the practice versions of the mine, antitank, H.E., heavy M-6A1 or M-6 and the mine, antitank, H.E., light, M-7A1 or M-7, respectively. They are almost exact replicas but can be differentiated from the H.E. mines by their color and lettering or by vents which are located around the fuze well. These vents allow the smoke and expanding gases from a detonated practice fuze to escape. The fuze M602 (T-20) is a practice version of the obsolete M-600 chemical fuse formerly issued with the service versions of these mines. The use of the practice fuse in inert models of the M6A1 and M-7A1 AT mine is dangerous and is prohibited. The absence of vents in the body of the inert models causes the gases to burst the case and propel fragments with considerable force.

(b) Mine, antipersonnel, practice, M-8, with fuze, mine M10A1 is a practice version of the M-2 series of bounding mines. The M10A1 fuse fires a delay flash igniter which propels a cardboard canister from the mine body into the air. The cardboard canister contains a "spotting charge" which bursts at a height of approximately six feet. The following precautions must be observed in using this item:

1. Use only the 4½ second delay flash igniter. These are colored black.

2. The spotting charge does not always fit easily into the cardboard canister. Do not strike the spotting charge when inserting it. Either enlarge the canister hole or twist and press the spotting charge in with a steady pressure.

3. Install the M10A1 fuze with the flash igniter attached before placing the canister in the mine body. No part of the body should be over the mine during or after installation.

4. Do not cover the canister with dirt or rocks.

5. The mine should be securely fastened to insure that it remains in an upright position. It is detonated by a trip wire during demonstrations. It is dangerous to use this mine in field problems or maneuvers as the canister is propelled from the mine body with sufficient force to cause injury to personnel who may be standing or running over it.

6. Occasionally the spotting charge fails to detonate. On these occasions, the canister is propelled from 30 to 60 feet into the air. Personnel must be alert to avoid the falling canister. The falling cannister must be recovered and the unfired spotting charge removed.

(3) High Explosives Mines.

(a) High explosive mines are painted olive drab with their nomenclature painted in yellow or black on the body of the mine. They are not normally used in training except for demonstration purposes. On such occasions, they will be detonated by an electrically primed one-half pound charge placed in contact with the cover plate of the mine. The top of the mine will be at least one inch below the surface of the ground. Personnel will wear steel helmets and be behind barricades, terrain features or in trenches at least 200 yards from the mine. No metal rocks or pebbles will be in contact with the mine or in the area immediately adjacent to the mine.

(b) The M6A1 antitank mine is fuzed by removing the safety clip from the M603 fuze and seating the fuze firmly in the fuze wall. The pressure plug is then screwed into the mine. The mine is armed by turning the lever on the pressure plug from "Safe" to "Armed." Do not force the lever if it does not move easily. The fuze might be sitting too high due to foreign material in the fuze well or imperfections in the mine.

(c) High explosive antipersonnel mines will not be detonated in training.

c. Firing Devices and Antipersonnel Mine Fuzes.

(1) Firing devices and fuzes for antipersonnel mines are used

extensively in training. They are used for activating antitank mines, fusing antipersonnel mines and installing booby traps. The following precautions will be observed in their use:

(2) General.

(a) Firing devices and fuzes either with or without their standard bases will not be pointed at personnel.

(b) Standard bases containing unfired percussion caps, firing devices, and fuzes will not be carried in the pocket.

(c) Standard bases containing unfired percussion caps will be kept separated from firing devices and fuzes until the firing device or fuze is ready to be installed in the mine or booby trap.

(d) Safety pins on firing devices and fuzes should be checked for ease of movement before attaching the standard base. The safety pins for locking and positive safeties should move easily.

(e) Camouflage of mines or booby traps should be completed before removing the positive safety from the fuze or firing device.

(f) Armed firing devices or fuzes which have a trip wire attached should have a positive safety installed before moving the trip wire.

(3) Firing Device, Delay Type, M1.

(a) Inspect firing device for any marks indicating that the ampule may have been crushed. Do not use if such indications exist.

(b) This firing device should not be disarmed because of the uncertainty of the chemical action on the retaining wire. When necessary to disarm, insert safety pin through inspection hole before disconnecting standard base.

(4) Firing Device, Pressure Type, M1A1.

(a) Arm by removing safety clip first and safety pin (positive safety) second.

(b) Disarm by inserting safety pin (positive safety) first and safety clip second.

(5) Firing Device, Pull Type, M1A1.

(a) To arm, remove locking safety first, positive safety second.

(b) To disarm, replace positive safety first, locking safety second. Do not touch trip wire until safety pins are in position.

(6) Firing Device, Pull-Friction Type, M-2.

(a) Fasten both ends of loose trip wire before removing safety pin.

(b) Reinsert safety pin to disarm before touching trip wire.

(7) Firing Device, Pull-Release Type, M-3.

(a) Anchors for fuze and trip wire must be firm and knots must not slip.

(b) To arm, remove locking safety first, positive safety second.

(c) To disarm, replace positive safety first, locking safety second, taking care not to move fuze body or trip wire.

(8) Firing Device, Pressure-Release Type, M-5.

(a) To arm, insert a nail or #10 gauge wire through interceptor hole. Remove locking safety first and nail or wire in interceptor holes second.

(b) To disarm, insert a positive safety (wire or nail) through the interceptor holes first and the locking safety second.

(9) Fuze, Combination, M6A1.

(a) Attach trip wires to anchors first and then to fuze before removing safety pins. Trip wires should not be taut.

(b) Remove locking safety first, positive safety second when arming.

(c) Insert positive safety first and locking safety second to disarm. Do not touch trip wires until safety pins are in position.

THRU M 3, OCAFF

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OFFICE, CHIEF OF ARMY FIELD FORCES
Fort Monroe, Virginia

ATENG 729.3/33(29 Sep 54) 29 September 1954

SUBJECT: Safeguards for the Use of Mines and Explosives in Training

TO: Distribution "F"

1. Reference is made to letter, ATENG 729.3/5(4 Feb 54), OCAFF, 4 February 1954, subject as above.

2. It is requested that the following changes to inclosure to reference letter be made:

a. Change subparagraph 2a(3) to read:

"Responsibility for over-all supervision of preparation, placement and firing charges of a demolition project is to be assigned to a commissioned officer. He will be present at the time of firing of all demolition projects though he need not be present at the firing of each individual charge. He will inspect all connections before firing and inspect the area after firing to determine that all charges have been detonated. He will supervise the neutralization of all misfires. This will apply when explosives are used to simulate gunfire. Safety regulations for weapons and simulators are prescribed in SR 385-310-1."

b. Change subparagraph 2f(3) to read:

"Immediately before firing any charge by personnel or students actually engaged with work in explosives, the warning cry 'Fire in the Hole' will be given three times to all personnel present; and if possible, three short blasts sounded on the siren. One long blast on the siren signifies that the charges have all been detonated or cleared. Charges fired as simulated artillery in infiltration or combat training courses or under simulated combat conditions as in tactical field problems, do not require the warning cry 'Fire in the Hole.'"

CN 60032

c. Change subparagraph 3b(3)(c) to read:

"High explosive antipersonnel mines are painted olive drab with their nomenclature painted in yellow or black on the body of the mine. They are not normally used in training except for demonstration purposes. On such occasions they will be detonated by electrically-primed, one-half pound charges placed in contact with the body of the mine. Personnel will wear steel helmets and be behind barricades, terrain features, or in trenches at least 200 yards from the mine."

FOR THE CHIEF OF ARMY FIELD FORCES:

SAMUEL J. CHILK
Lt Col, AGC
Asst Adjutant General

OFFICE, CHIEF OF ARMY FIELD FORCES
Fort Monroe, Virginia

ATENG 729.3/5(4 Feb 54) **4 February 1954**

SUBJECT: Safeguards for the Use of Mines and Explosives in Training

TO: **See distribution**

1. The inclosed memorandum specifies the appropriate safeguards for the use of explosives and explosive devices in training. The rising incidence of training accidents involving explosives of various types indicates that existing regulations are not adequate, or are not being followed in all cases. More complete instructions, similar to those contained in inclosure, will be contained in a forthcoming revision of SR 385-310-1.

2. Pending issuance of the revised SR 385-310-1 the provisions of the inclosed memorandum will be utilized in the conduct of applicable training under the jurisdiction of this Office.

FOR THE CHIEF OF ARMY FIELD FORCES:

T. J. Smith

T. J. SMITH
Colonel, AGC
Asst Adjutant General

1 Incl
Safeguards for the Use of Mines and Explosives in Tng

DISTRIBUTION:
'R'

Army-OCAFF-5596

DISPOSITION FORM

SECURITY CLASSIFICATION (If any)

D-4 22-m

FILE NO. ATHRC

SUBJECT Request for OCAFF Letters

TO Chief
Army Field Forces
Fort Monroe, Virginia
ATTN: DT-4

FROM Acting Chief
Human Research Unit #3
OCAFF
Fort Benning, Georgia

DATE 3 August 1954

COMMENT NO. 1
RAMOND/Lt/js
25107

Request that two (2) copies of each of the following letters be sent this unit for use in connection with Task TRAINFIRE:

a. Letter, ATTNG 21 353.1/25, dated 11 April 1951, Subject: "Technique of Fire and Combat Firing Problems."

b. Letter, ATTNG 23 353/22, dated 13 February 1953, Subject: "Rifle Marksmanship Qualification Course."

Charles K. Ramond
CHARLES K. RAMOND
1st Lt AGC

RECEIVED
6 AUG 1954
DT

TO Chief
Human Research Unit No 3, OCAFF
Fort Benning, Georgia

FROM DT-4, OCAFF

DATE 10 Aug 54

COMMENT NO 2
PARR/Maj/5271/bft

1. Reference is made to a letter from Unit No 3 to OCAFF dated 8 February 54 which requested copies of "Technique of Fire and Combat Firing Problems," and "Rifle Marksmanship Qualification Course." As per the request the subject material was forwarded to the Unit on 16 February 54.

2. Attached are two copies of OCAFF letter, ATTNG-21 353.1/25(11 Apr 51), dated 11 April 1951, subject: "Technique of Fire and Combat Firing Problems."

3. The letter, ATTNG-23 353/22 dated 13 February 1953, subject: "Rifle Marksmanship Qualification Course," is not available at present. However, G3(80), Training Aids and Publications, has furnished us with the information that this letter is being published as Change 1 to Field Manual 23-5. This Manual is now at the printers and will be published shortly.

12 AUG '54 AM

1 Incl
Ltr fr OCAFF to multi-addr
dtd 11Apr54, subj: Technique
of Fire and Combat Firing (dupe)
Problems

for MERROD FOR RUTLEDGE

DI 45025

DD FORM 96

OFFICE, CHIEF OF ARMY FIELD FORCES
Fort Monroe, Virginia

ATTNG-21 353.1/25(11 Apr 51) 11 April 1951

SUBJECT: Technique of Fire and Combat Firing Problems

TO: Commanding Generals
9th Infantry Division
3d Armored Division
101st Airborne Division
8th Infantry Division
10th Infantry Division
6th Armored Division
5th Armored Division
6th Infantry Division
7th Armored Division
5th Infantry Division
Field Artillery Replacement Training Center
Medical Replacement Training Center
Fort Sam Houston, Texas
Medical Replacement Training Center
Fort George G. Meade, Maryland
Chemical Replacement Training Center
Engineer Replacement Training Center
Ordnance Replacement Training Center
Quartermaster Replacement Training Center
Signal Replacement Training Center
Transportation Corps Replacement Training Center
Military Police Replacement Training Center
Hawaiian Replacement Training Center, USARPAC
Panama Replacement Training Center, USARCARIB

1. Inclosed for your information and possible use in training in fire control and fire distribution and squad defensive tactics are a series of problems recently observed in use at one training division. These problems have proven to be highly satisfactory in teaching these subjects. Detail diagrams of range and target construction and communication system are also attached.

2. In conducting training with these problems, scoring the targets after each exercise is important in that confidence is given the individuals to work as a team; competition is created among squads, and instructors can ascertain the actual effectiveness of the fire of the squad.

Over

Incl 1

3. Reference paragraphs 2b(7), problem 4, and 2b(7), problem 5, which indicates defending troops leave foxholes to assault bayonet dummies, your comments regarding the value of this phase of the problems and soundness of such a practice are requested at the earliest practicable date.

FOR THE CHIEF OF ARMY FIELD FORCES:

NEIL M. MATZGER
Lt Col, AGC
Asst Adjutant General

4 Incls
1. SOP "X," Hq 9th Inf Div
2. Engr Plan, Range #9
3. Sketch - Description Range #9
4. Drawing - Pull Type - Target and Bayonet Dummy

Copies furnished: (w/o incl 2, 3 & 4)
Chiefs of Tech & Admin Services
CG's
Military District of Washington
Continental Armies

RANGE SOP "X"

TECHNIQUE OF FIRE AND COMBAT FIRING

1. RESCISSION (deleted).

2. PURPOSE. - This SOP is published to familiarize all personnel with the procedure to be followed when firing on combat ranges #6, #7, #8 and #9.

3. GENERAL.

a. The combat ranges are located - - - - - - (See Incl 6).

b. Units training under ATP 7-600 and 7-601 will fire problems No 1, 2, 3, 4 and 5 as outlined in par 5. Eight (8) hours are allotted for firing problems No 1 thru 4 (Day Firing) and four (4) hours are allotted for firing problem No 5 (Night Firing).

c. (Deleted.)

d. Units training under ATP 21-110N will fire problems No 1 thru No 4 (Day Firing).

e. Only two (2) platoons will be scheduled to fire problem No 5 (Night Firing) on any one night. Priority in scheduling will be given to personnel training under ATP 7-600.

f. (Deleted.)

4. RESPONSIBILITY.

a. The Range Officer, G3 Section, will be responsible for:

(1) Furnishing a sufficient number of qualified personnel to arm the explosive charges for the shell holes on Range #6 before each squad conducts the problem.

(2) The presence of an ambulance during firing.

b. Commanders of units using the ranges will be responsible for:

(1) Organization of their units into nine (9) man squads with cadre acting as squad leaders and trainees acting as assistant squad leaders.

(2) Conducting the firing, and the squad tactical problems used in conjunction with the firing as outlined in par 5.

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(3) Enforcement of safety regulations and establishment of safety limits and road blocks.

(4) Conducting an on-the-spot-critique after each squad completes a problem.

(5) Providing sufficient cadremen for assistance in the operation of the ranges.

(6) The presence of ample cleaning and preserving materials for individual arms.

5. PROCEDURES.

a. Upon arrival at the combat ranges, the company will detruck at Range #9 (see incl 6) and move to a point approximately twenty (20) yards behind the firing line of Range #9 to witness the demonstration of the course as outlined in par 2 of inclosure 4.

b. After the demonstration at Range #9 the company will be divided into four (4) groups. (Groups will be divided into squads of nine (9) men). One group will move to Range #6, one group will move to Range #7, one group will move to Range #8, and one group will remain at Range #9.

c. Ranges #6, #7, #8 and #9 will be fired concurrently. The groups will be rotated until each group has fired on all four (4) ranges.

d. Problem No 1 will be fired on Range #6 (see incl 1), problem No 2 will be fired on Range #7. (See incl 2.) Problem No 3 will be fired on Range #8. (See incl 3.) Problem No 4 will be fired on Range #9. (See incl 4.)

e. Problem No 5 will be fired, at night, on Range #9. Four (4) hours are allotted for firing two (2) platoons. Only two (2) platoons of a unit will fire on any one night.

6. AMMUNITION.

a. Ammunition will be requisitioned and drawn by the using unit in compliance with Range SOP "B."

b. Type and amount to be drawn:

(1) Problem No 1 - Thirty-two (32) rds, cal .30 ball ammunition per trainee.

(2) Problem No 2 - Eight (8) rds, cal .22 per trainee.

(3) Problem No 3 - Eight (8) rds, cal .30 ball ammunition per trainee.

(4) Problem No 4 - Twenty-four (24) rds, cal .30 ball ammunition, per trainee.

(5) Problem No 5 - Twenty-four (24) rds, cal .30 ball ammunition, per trainee. One (1) practice grenade, per trainee. Four (4) flares, parachute (or shell, illuminating 60-mm) per nine (9) men.

7. UNIFORM AND EQUIPMENT.

a. Uniform:

(1) Steel helmet.

(2) Jacket and trousers, HBT.

(3) Combat boots.

b. Equipment:

(1) Belt, cartridge, cal .30, with full, first aid pouch and packet.

(2) Combat packet.

(3) Individual arms w/bayonet.

8. SAFETY REGULATIONS. - Instructions on safety regulations will be given by the units concerned immediately prior to the commencement of firing.

PROBLEM NO 1

TECHNIQUE OF FIRE AND COMBAT FIRING

(Range #6)

1. PURPOSE. - To teach the trainee application of fire of a squad in position, afford the trainee practice in receiving and reacting to fire commands, proper distribution of fire and methods of fire control, and proper technique of assault fire.

2. PROCEDURE.

a. This exercise begins with the squad in position about 15 yards in rear of a berm between Pts A and B. (See attached sketch Range #6.) Squad leader will move his men in position, assign each man a sector of fire, give the command to lock and load (8 rds), and issue the fire command to the squad. When each man has expended his ammunition the instructor will explain the next step of the exercise, which consists of moving forward rapidly through enemy artillery, and bringing assault fire on stationary targets. He will give the command to lock and load and signal the men to move forward. As the squad moves over the berm the TNT charges (representing artillery fire) will be detonated. The instruction and his assistants will cause the men to move forward quickly. When out of the artillery fire, the squad resumes its assault fire on the first group of targets. They continue firing until they reach phase line #1.

b. At phase line #1 the squad will be halted. Firers will reload and await the instructor's order to move forward. Upon his signal they will advance to phase line #2, firing on all targets as they appear. Upon halting at phase line #2 the firers will reload and move forward on command of the instructor to phase line #3. Upon reaching phase line #3 rifles will be cleared and all unexpended ammunition will be turned in to the officer-in-charge. A critique will be held upon completion of the exercises as follows:

(1) Targets will be marked and scored. The squad will be informed of its score. Inter-squad competition will be encouraged.

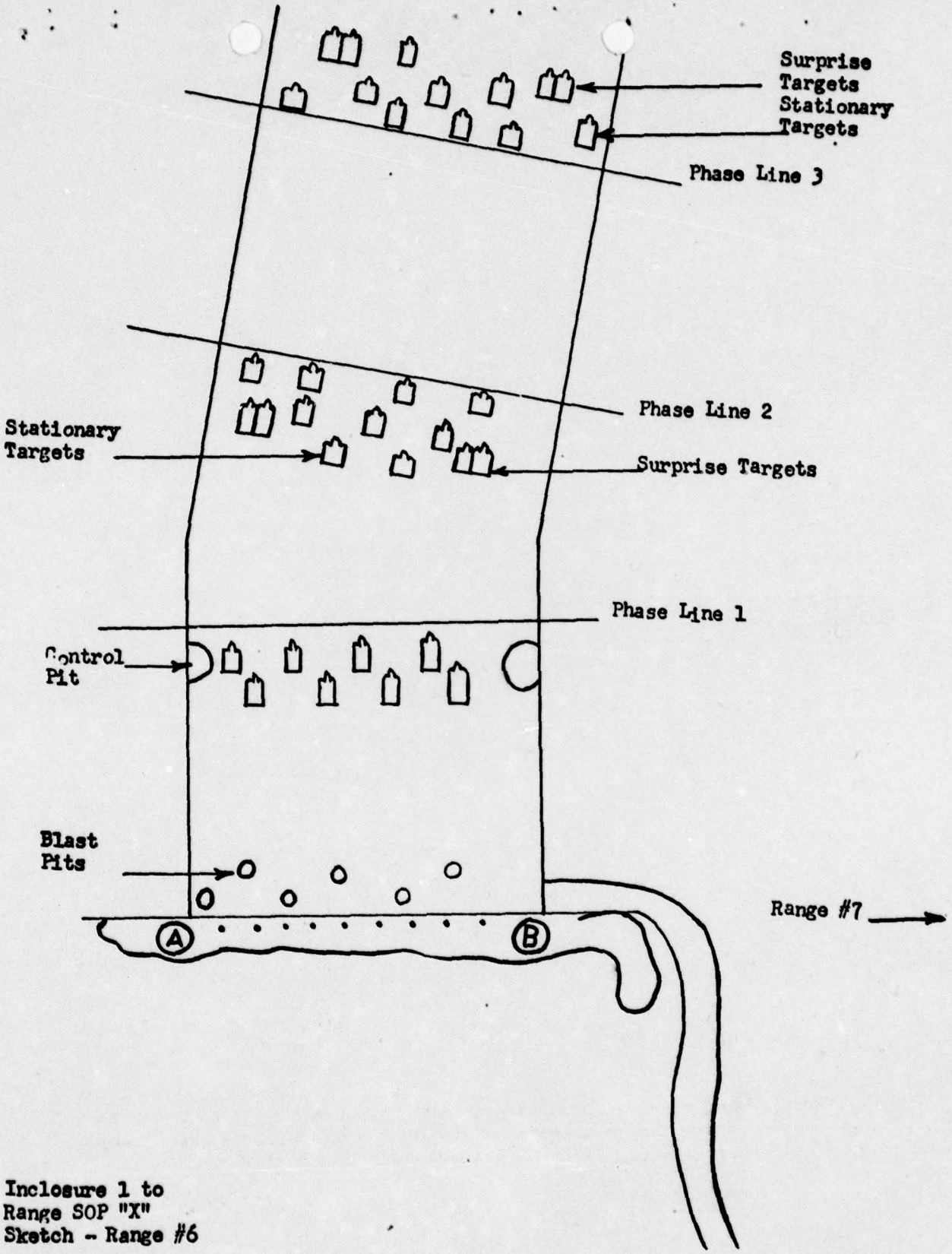
(2) Emphasis will be placed on the effectiveness of properly distributed fire, fire control when in position and when using assault fire, and the technique of assault fire.

3. OTHER DETAILS.

a. Each phase of the exercise will be explained to the trainee prior to any firing. At each phase line the instructor will point out mistakes made from one phase line to the other, prior to commencing to the next phase line.

b. Ammunition requirement. - Thirty-two (32) rounds, cal .30 ball ammunition, per trainee.

c. Three (3) telephones are required for the operation of this range.



Inclosure 1 to
Range SOP "X"
Sketch - Range #6

PROBLEM NO 2

LANDSCAPE TARGET FIRING

(Range #7)

1. REFERENCE. - Par 145-152, FM 23-5.

2. PURPOSE.

a. To provide instruction in target designation, fire orders and distribution of fire.

b. To illustrate the effects of concentrated and distributed fire.

3. PROCEDURE.

a. This exercise is fired on Range #7. (See attached Sketch Range #7.)

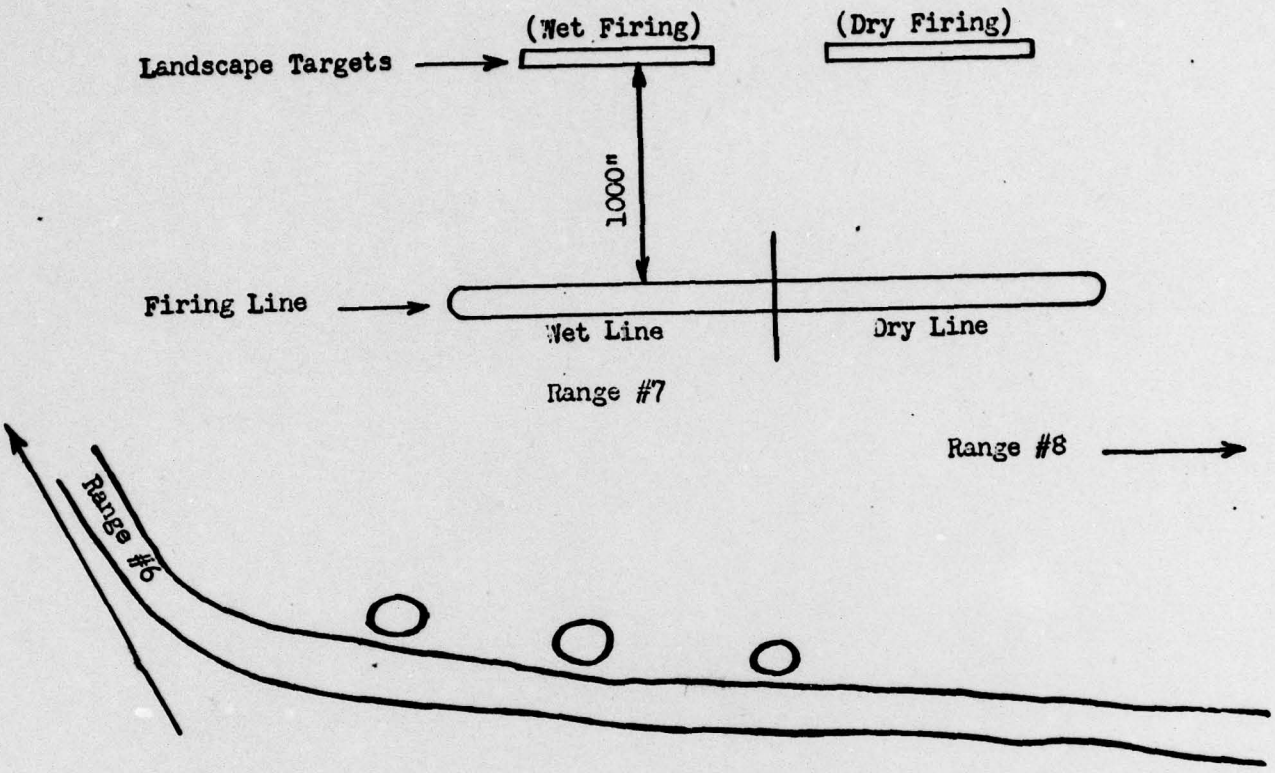
b. A squad consisting of nine trainees will be oriented as to the nature of the exercise, its purpose, and the method of scoring.

c. Eight rounds of cal .22 ammunition will be issued to each firer.

d. The instructor will select targets requiring both concentrated fire and distributed fire. Firing will be initiated by issuing a complete fire order. Target designations will make reference to the direction cards and range indicators on the targets, and two at linear targets.

e. Targets will be marked and squad score will be recorded. (Note: For detailed scoring procedure see par 148e and 151, FM 23-5.)

Inclosure 2 to
Range SOP "X"



Inclosure 2 to SOP "X"
Sketch - Range #7

PROBLEM NO 3

SECTORS OF FIRE

(Range #8)

1. PURPOSE. - This exercise is designed to:

a. Provide practice in control and distribution of fire against concealed linear target.

b. Illustrate the effectiveness of well aimed fire directed against a concealed enemy whose approximate location is known.

2. PROCEDURE.

a. A firing order will consist of one (1) squad of nine (9) men.

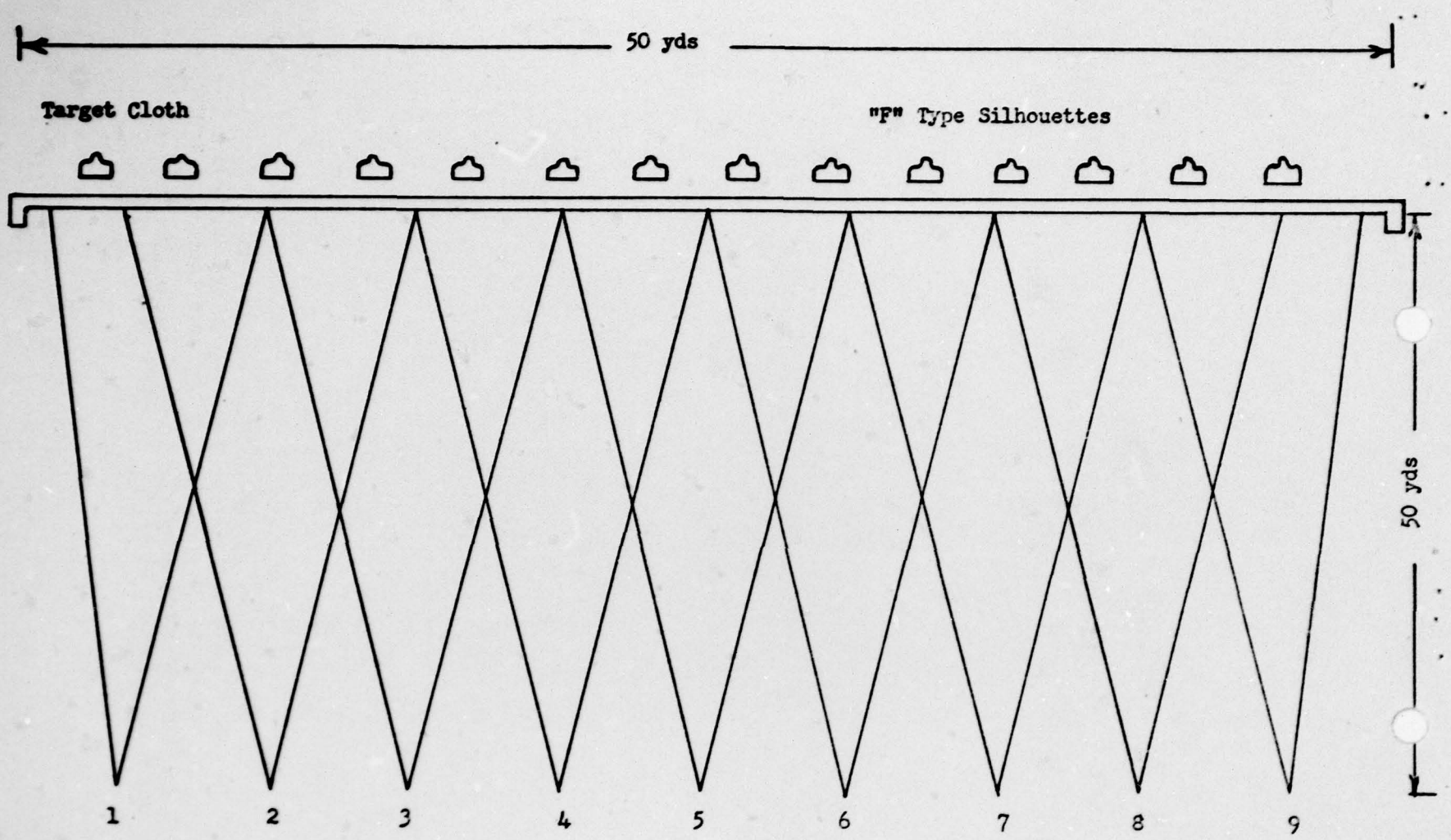
b. The instructor will explain to each squad that many times in combat it is necessary to neutralize a specific area, or target, when it is known that enemy personnel are occupying that particular area. (For example: In the attack, a squad may be supporting, by fire, another element in order to permit its movement without detection by the enemy. In this case it is necessary that the whole target area be covered with accurate, controlled, distributed fire.) It should be pointed out that this type of fire will cause the enemy to stay down in his foxhole, or it will cause casualties to be inflicted upon him. In either case the mission of the squad is accomplished.

c. After the explanation of the exercise each man will be issued one (1) clip of ammunition, ball, cal .30 and he will be assigned a sector of fire. (For this exercise, sectors of fire are clearly defined by the painted logs on the ground installed from the firer's position to the target area. Each firer will have a separate color to indicate his particular sector of fire. See attached Sketch - Range #8.)

d. Firing will commence and cease upon order of the instructor.

e. Upon completion of the firing, the instructor will move the squad forward to the line of targets and conduct a critique. During the critique it will be pointed out that although an enemy by keeping well down would have had only a few casualties, the mission of the squad would have been accomplished by virtue of the fact that the enemy would have been unable to fire without receiving casualties.

3. DESCRIPTION OF THE RANGE. - This range is approximately fifty (50) yards wide and fifty (50) yards long. Camouflaged target cloth is installed across the entire width of the range. F-type silhouette targets are located and concealed from the firer by the target cloth. (See attached sketch - Range #8.)



Sectors of Fire
Range 8

Inclosure 3 to
Range SOP "X"

PROBLEM NO 4

SQUAD DEFENSE PROBLEM (DAY FIRING)

(Range #9)

1. PURPOSE.

a. To illustrate how well aimed fire, when properly controlled and distributed, can prevent large numbers of enemy personnel from completing their assault and closing with the defenders.

b. To teach the trainee fire distribution and fire control by application.

2. PROCEDURE.

a. Upon arrival the company will be formed into squads of nine (9) men each and moved to a point within 20 yards behind the firing line for a demonstration of exercise.

b. The demonstration will be conducted as follows:

(1) The instructor will explain the purpose of the exercise as stated in par 1, above.

(2) The demonstration-squad will fix bayonets, draw three (3) clips of cal .30 ammunition, and one (1) practice grenade from the ammunition point and move forward on signal of the instructor. Upon arrival of the demonstration-squad the instructor will give them the following orientation:

"This position has been held by one squad of this company for the past three (3) days. Since your squad has been in reserve, you have been chosen to relieve it. The enemy has consistently been launching attacks against this position in large numbers. Sometimes the odds were as high as six to one in their favor, but each time the attack was repulsed. I want to remind you that this position is an extremely important one and it must be held at all costs.

"Numbers 1, 2, 3, occupy the first three positions on the left flank. Your sector of fire will be to the left front. Numbers 4, 5, 6, occupy the three center positions. Your sector of fire will

be to the front. Numbers 7, 8, 9, occupy the three positions on the right flank. Your sector of fire will be to the right front. Be alert and ready for attack at any time. In case we receive enemy mortar or artillery fire keep your head down and as soon as it lifts, be ready to hit the enemy in his assault. Be sure to cover your assigned sectors of fire but do not fire wildly or without purpose. Keep calm and cool, and fire only when you have an enemy in your sight. Ammunition is important and must be conserved. One bullet should account for one enemy. If the enemy gets within 30 yards of this position, let him have it with the grenades. If he gets closer, repel him with your bayonet and don't forget, that bayonet can account for more than one aggressor, so don't break it. Are there any questions? Move into positions." (See inclosure 4.)

(3) When the squad has occupied the position the instructor commands: "Lock and load, one (1) clip, ball ammunition. Reload when necessary throughout the remainder of the exercise."

(4) The Control Officer then causes all targets in Group 1 to be raised. Upon appearance of the first group of targets the squad leader issues a fragmentary fire command. Example:

Range 280
Enemy
Commence firing

Targets will be exposed for a period of forty (40) seconds.

(5) Immediately after targets in Group 1 disappear the Control Officer causes targets in Group 2 to be raised. (No other fire commands will be issued.) These targets will be exposed for forty (40) seconds.

(6) Immediately after targets in Group 2 disappear the Control Officer causes targets in Group 3 to be raised. These targets will also be exposed for forty (40) seconds. As soon as this group of targets

disappear the Control Officer commands, "Unload. (Bolts will be left open when pieces are cleared.) Be prepared to use your grenades." He then signals for the grenade targets to be raised and the men throw their grenades.

(7) After grenades have exploded the Control Officer commands: "Be prepared to assault with bayonets." He then signals for bayonet dummies to appear. After men have assaulted the bayonet dummies, a critique will be held on the firing line, emphasize the points outlined in par 1, above.

(8) Upon completion of the demonstration, the company will be divided into four (4) groups as outlined in par 5 of Range SOP "X."

3. PIT DETAILS.

a. Range #9

(1) Pits #1 and #2 each require 2 target operators, and 1 telephone operator.

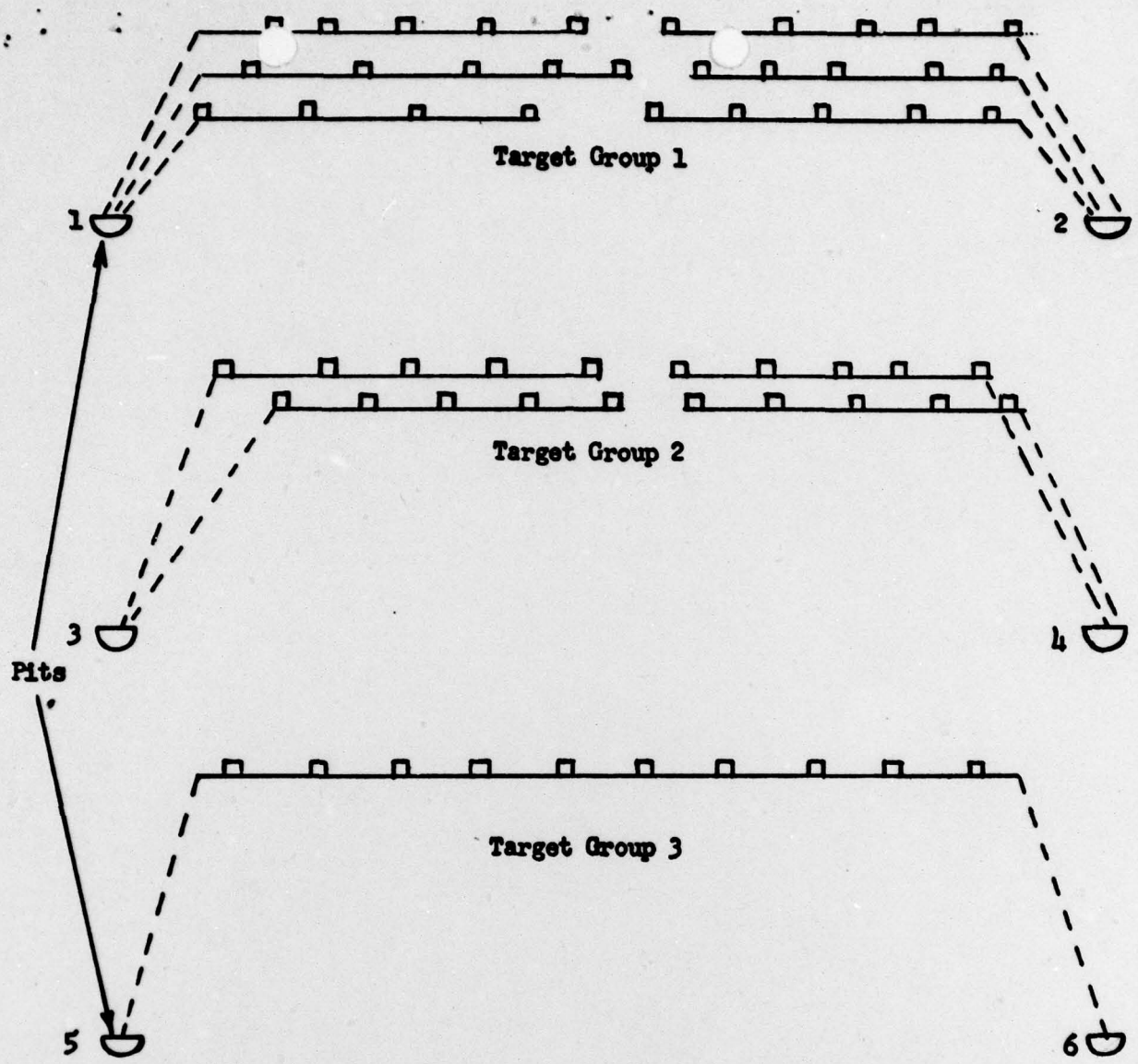
(2) Pits #3 and #4 each require 2 target operators, and 1 telephone operator.

(3) Pits #5 and #6 each require 2 target operators, and 1 telephone operator.

(4) The Firing Line requires 1 telephone operator, 2 operators for grenade targets and 5 operators for bayonet dummies.

4. SCORING. - Target operators will check and mark targets when the range is clear and report the number of hits in each group to the Control Officer.

5. COMMUNICATIONS. - Seven (7) telephones are required for operation of this range.



To Concurrent Training Area

Inclosure 4 to
Range SOP "X"
Sketch - Squad Defensive Firing
Range #9

PROBLEM NO 5

NIGHT DEFENSIVE FIRING

(Range #9)

1. PURPOSE.

a. Application of night firing by trainee.

b. To teach trainee that the principles of fire distribution and fire control apply in night firing as well as day firing.

c. To show the trainee the effectiveness of the various illumination shells and flares that are available to a rifle company in the field.

d. To give the trainee confidence in his ability to hit a target at night.

2. PROCEDURE.

a. Upon arrival, the two (2) platoons will be formed into nine (9) man squads and moved to a point approximately twenty (20) yards behind the firing line for a demonstration of the exercise.

b. The demonstration will be conducted as follows:

(1) The instructor will explain the purpose of the exercise as outlined in par 1, above.

(2) The demonstration-squad will fix bayonets, draw three (3) clips of cal .30 ammunition, and one (1) practice grenade from the ammunition point and move forward to the firing line. When the demonstration-squad arrives at the firing line the instructor will give them the following tactical situation:

"Your squad has occupied this position for the past forty-eight (48) hours. During this period the enemy has attacked this position twice in daylight hours, and both times, he was repulsed with heavy losses. Our S2 informs us that there is a possibility that the enemy may attempt a night attack in order to take this position with

fewer losses. We have prepared for such an event by placing listening posts about three hundred (300) yards to the front of our position. In the event any movement of the enemy is detected we will be notified by the listening post, immediately, and certain members of the squad, previously designated, will fire flares to illuminate our sector of defense.

"Numbers 1, 2, 3, occupy the first three positions on the left flank. Your sector of fire will be to the left front. Numbers 4, 5, 6, occupy the three center positions. Your sector of fire will be to the front. Numbers 7, 8, 9, occupy the three right flank positions. Your sector of fire will be to the right front. If any enemy movement is detected by the listening post you will be notified. When notified of enemy movement, unlock your pieces and be prepared to fire on any enemy in sight when our sector is illuminated. If the enemy gets in close enough be prepared to repel him with grenades and bayonets."

(3) When the squad has occupied the position the instructor commands: "Lock and load, one (1) clip, ball ammunition. Reload when necessary throughout the remainder of the exercise."

(4) The instructor then causes all targets in Group 1 to be raised. He informs the squad: "The listening post reports approximately thirty (30) enemy personnel headed in this direction and about 280 yards to our front. Be prepared to let them have it." He then signals for the first flare to be fired.

(5) Approximately five (5) seconds before the first flare burns out, the instructor will cause the targets in Group 2 to be raised and will signal for another flare to be fired over the targets in Group 2.

(6) Approximately five (5) seconds before the second flare burns out, the instructor will cause the targets in Group 3 to be raised and will signal for the third flare to be fired.

Problem No 5 - Night Def Firing (Cont)

(7) Approximately five (5) seconds before the third flare burns out, the instructor will cause the targets of Group 3 to disappear, signal for the fourth flare, commands: "Unload and lock your pieces, be prepared to use your grenades," causes the grenade targets to be raised and immediately after grenades are thrown signals for the bayonet dummies to be raised and commands: "Charge."

(8) After the assault on the bayonet dummies, the pits detail will mark the targets and inform the instructor of the number of hits on each group. A critique will be held on the firing line, emphasizing the points outlined in par 1, above. Squad competition is encouraged.

4. Upon completion of the demonstration the first squad to fire the exercise will be moved forward. Procedure for running the exercise will be the same as that used by demonstration-squad, except it will not be necessary to give the detailed tactical situation to each squad.

5. PITS DETAILS.

a. Personnel:

(1) Pits #1 and #2 each require 2 target operators, and one telephone operator.

(2) Pits #3 and #4 each require 2 target operators. and one telephone operator.

(3) Pits #5 and #6 each require 2 target operators, and one telephone operator.

(4) The firing line requires 1 telephone operator, 2 target operators for grenade targets and 5 target operators for the bayonet dummies.

b. Ammunition and Equipment:

(1) Nine (9) telephones.

(2) Twenty-four (24) rds, cal .30 ball ammunition per trainee.

Over

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(3) One (1) practice grenade per trainee.

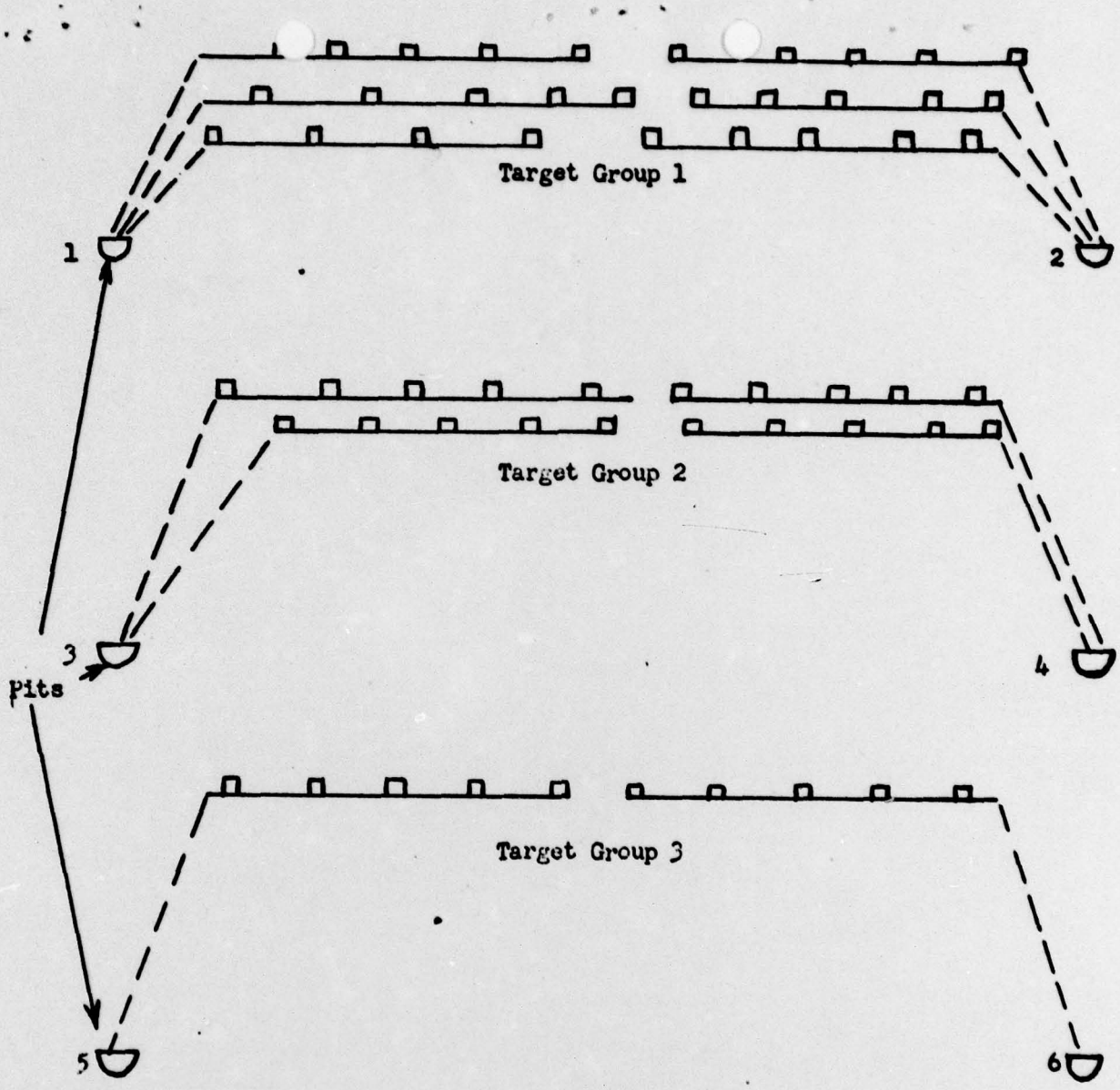
(4) Four (4) flares, parachute, per squad or four (4) shells, illuminating if 60-mm mortar is used.

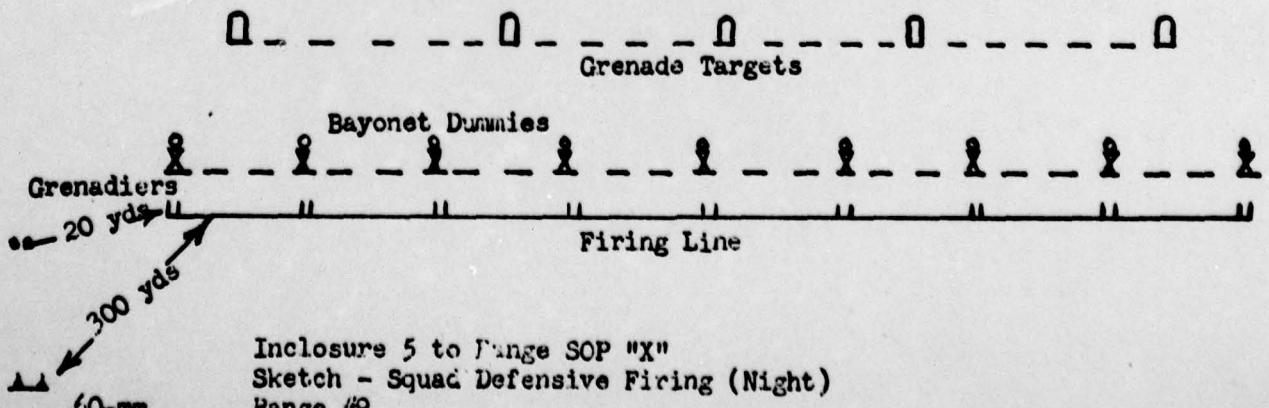
(5) Two (2) rifles, M-1 w/grenade launcher or one (1) 60-mm mortar if shells illuminating 60-mm are used.

(6) Flashlights as deemed necessary for pits detail and firing line.

6. OTHER DETAILS.

a. Unit commanders will make a reconnaissance of Range #9 during daylight hours to determine the position of the mortar, if 60-mm shells, illuminating, are used or the position of the grenade firers if flares, parachute, are used. If 60-mm mortar is used, it should be located approximately 200 yds to the rear and to the left of the firing line. Wire will be furnished by the using unit. (See attached sketch.)





Inclosure 5 to Range SOP "X"
Sketch - Squad Defensive Firing (Night)
Range #9

Inclosure 6 to
Range SOP "X"
Sketch of Combat Ranges